

REMARKS

Claims 1-26 are pending and have been examined. Claims 1-26 stand rejected. Claims 1, 2, and 4 have been amended. No new matter has been introduced. Reconsideration and allowance of Claims 1-26 is respectfully requested.

The Information Disclosure Statement filed May 9, 2002

Applicants filed an Information Disclosure Statement on May 9, 2002. A copy of the Information Disclosure Statement is attached. Applicants request that the Examiner provide a copy of the Examiner-initialed Information Disclosure Statement with the next Office Action indicating that the Examiner has considered the references cited in the statement.

The Rejection Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected Claims 1-26 under 35 U.S.C. § 112, second paragraph, as being indefinite. According to the Examiner, the claims are narrative in form and describe only the function of the apparatus without recitation of any structure to perform the recited function. Claim 1 from which Claims 2-26 depend, has been amended to recite that the magnetic separator comprises means for providing an inhomogeneous magnetic field. Similarly, Claims 2 and 3 have been amended to recite that the magnetic separator of Claim 1 further comprises means for providing a homogeneous magnetic field, and means for providing a transverse gradient magnetic field, respectively. Therefore, all the pending claims as amended recite at least one structure to perform the recited function. Accordingly, applicants respectfully request withdrawal of this ground of rejection.

The Rejection Under 35 U.S.C. § 101

The Examiner has rejected Claims 8 and 9 under 35 U.S.C. § 101 as being directed to a natural phenomenon. According to the Examiner, the amount the magnetic field decreases as a result of the increase in the gap is a natural phenomenon. Applicants respectfully disagree.

According to M.P.E.P. § 2106 VI.B.1.(c),

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-14 (1853). However, a signal claim directed to a practical application of electromagnetic energy is statutory regardless of its transitory nature. See *O'Reilly*, 56 U.S. at 114-19; *In re Breslow*, 616 F.2d 516, 519-21, 205 USPQ 221, 225-26 (CCPA 1980).

Moreover, M.P.E.P. § 2106 II.A. states, that

Claims drawn to a long-distance telephone billing process containing mathematical algorithms were held to be directed to patentable subject matter because "the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle." *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999).

Claims 8 and 9 are not directed to the strength of a magnetic field *per se*, but to the practical application of an inhomogeneous magnetic field in a magnetic separator for charged particle beam separation. Like the claims in *AT&T*, Claims 8 and 9 apply mathematical algorithms to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle. Accordingly, applicants respectfully request withdrawal of this ground of rejection.

The Rejection Under 35 U.S.C. § 102(b)

The Examiner has rejected Claims 1-4, 6, 20, and 22 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,043,488 (Bahatt et al.). According to the Examiner, the Bahatt reference discloses a magnetic separator for charged particle beam separation that provides a linear dispersion of the charged particles proportional to their mass-energy-to-charge ratio, wherein the linear dispersion is achieved by an inhomogeneous magnetic field. Applicants respectfully disagree.

The present invention addresses the problem that separation of adjacent particles with mass-energy to charge ratios that differ by fixed amounts is a nonlinear function of position

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when using a uniform magnetic field such that larger mass-energy to charge ratios lie significantly closer than lower ratios (Specification, page 2, lines 18-22). According to the claimed invention, the magnetic separator provides a *linear* dispersion of the charged particles proportional to their mass-energy-to-charge ratio by using an inhomogeneous magnetic field. The Bahatt reference does not teach or suggest an inhomogeneous magnetic field or linear dispersion of the charged particles. Rather, the Bahatt reference describes a method and separation system for removing the carrier ions from the ion beam before entering the mass spectrophotometer to prevent space charge effects and to minimize detector saturation problems (see, Col. 1, lines 60-64). Specifically, the magnetic field used in the Bahatt reference is not a function of any spatial coordinate, but is a homogeneous magnetic field (see, Col. 2, lines 53-64), similar to that described for prior art magnetic separators in the present application (see page 1, line 20 to page 2, line 7; page 6, line 9 to page 7, line 20; FIGURE 1A-C). Thus, the Bahatt reference does not disclose or suggest the use of an inhomogeneous magnetic field in a magnetic separator to provide a linear dispersion of the charged particles. Withdrawal of this ground of rejection is respectfully requested.

The Rejection Under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 5 and 10-16 under 35 U.S.C. § 103(a) as being obvious over Bahatt et al., and Claims 17-19 as being obvious over Bahatt et al. in view of U.S. Patent No. 5,317,151 (Sinha et al.). Applicants respectfully disagree.

Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness. There are three requirements for establishing a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in knowledge generally available to one of ordinary skill in the art, to modify the reference.

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Second, there must be a reasonable expectation of success. Third, the prior art reference must teach or suggest all the claim limitations.

Applicants submit that there is no suggestion or motivation, either in the Bahatt reference or the Sinha reference, with or without the knowledge generally available to one of ordinary skill in the art, to use an inhomogeneous magnetic field in a magnetic separator to provide a linear dispersion of the charged particles. As explained in the previous section, the Bahatt reference does not teach or suggest the use of an inhomogeneous magnetic field in a magnetic separator to provide a linear dispersion of the charged particles. The teachings of the Sinha reference do not cure the deficiencies of the Bahatt reference. The Sinha reference does not teach or suggest the use of an inhomogeneous magnetic field to achieve linear dispersion of charged particles. In fact, the Sinha reference explicitly specifies the use of a homogeneous magnetic field by stating that "[t]he two opposing pole piece surfaces delimit a uniform magnetic field region through which ion beam 5 passes after leaving the electric sector 6 (see, Col. 5, lines 10-13, emphasis added). Therefore, the Bahatt and Sinha references, either alone or in combination, fail to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed. Withdrawal of this ground of rejection is respectfully requested.

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Conclusion

In view of the above amendments and foregoing remarks, applicants believe that Claims 1-26 are in condition for allowance. If any issues remain that may be expeditiously addressed in a telephone interview, the Examiner is encouraged to telephone applicants' attorney at 206.695.1755.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

Date: May 13, 2004

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